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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/928,356	08/14/2001	Robert Lempkowski	212761US99	6433

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ALEXANDRIA, VA 22314

EXAMINER

BAUMEISTER, BRADLEY W

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 05/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.  
09/928,356

Applicant(s)  
Lempkowski et al.

Examiner  
B. William Baumeister

Art Unit  
2815



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on Mar 25, 2003
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-40 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some\* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 7 6) ☐ Other:

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## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments filed 3/25/2003 have been fully considered but they are not persuasive.

a. Applicant argues that the Examiner's taking of Official Notice is deficient because it is so general, and so non-specific, that it effectively prevents Applicants from rebutting the present rejection, which relies upon the Official Notice to supply particular claim limitations. To support this position Applicant asserts (REMARKS):

[b]ecause for a proper *prima facie* case of obviousness to be presented the prior art must be considered as a whole, and motivation must exist for the proper combination of elements therein, it is essentially impossible for applicants to discuss whether and how the rejection might or might not meet these requirements. Applicants are entitled to evidence on the issue of Official Notice, and further are entitled to the Examiner's reasoning with regard to specific limitations in the pending claims. For example, how is Applicant to respond to the rejection of [particular claim(s)] when the only information provided in the Official Action regarding the claimed [components] is a non-specific and unsupported assertion that such components were known, perhaps in other contexts, in different arrangements and different devices? The reasoning is simply too vague. In fact, the reasoning is so vague, and so lacking in specifics, that it fails to present a *prima facie* case of obviousness supportable by reference to objective evidence. In this regard, Applicants again note their seasonable challenge to the taking of Official Notice, and require supplementation of the record along with a reasoned statement of rejection, or a Notice of Allowance.

b. First, the Examiner notes that the prior rejection did set forth support for all of the layers, elements, components and/or interconnections that were claimed. For example, the specific order and compositions of the respective recited layers were taught by the various

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references specifically cited in the rejection. Further, the Examiner explained that the specific devices, components and interconnections that were formed on/in/between the various layers were conventional, and specifically provided a basis for this conclusion: either (1) by supplying references that taught these particular components; (2) by citing to prior-art references in Applicant's IDS submission(s) that disclose these components; and/or by citing specific portions of Applicant's specification which acknowledges that these particular components were conventional. The Office Action further provided motivation as to why these various references and prior-art admissions were combined in the manner set forth in the rejection. As such, the rejection does, in fact, set forth a *prima facie* case of obviousness with sufficient support and specificity of reasoning such that Applicant can properly address the rejection.

c. In further regard to the argument that the taking of Official Notice was unsupported and too vague, the Examiner notes that the bases were sufficiently supported and evidenced because the Examiner pointed to various sources that provide support for the conclusion that the particular devices were conventional. For example, in many instances the Examiner pointed out portions of the specification where Applicant acknowledged that the devices were "typical." As such, the Examiner has already provided evidence sufficient to support Official Notice, and the burden has shifted to Applicants to rebut or refute this showing, for example by (1) providing sufficient evidence that these statements in the specification were not admissions that the "typical devices" constitute prior art (e.g., that the device was only known in-house) or (2) specifically pointing out those particular claim limitations that further distinguish the

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device/component *as claimed* from the “typical” or conventional device/component. Applicant has not made any such arguments.

Further, the fact that the rejection’s reliance was upon propositions (e.g., that the particular devices/components were known) that were general, does not indicate that the rejections were overly broad or vague. Rather, it is indicative of the breadth of the claims as currently presented: i.e. that the rejection of the claim(s) did not require a showing that was any more specific than that which was made because the claim language was so broad.

d. Accordingly, because the rejection sufficiently explained the Examiner’s position as to why all of the devices and layers were known, why one skilled would have wanted to combine all of the layers and specific components in the manner set forth, and because sufficient evidence has already been provided to support those portions of the rejection that rely upon Official Notice, the rejections are still deemed to be proper.

#### ***Allowable Subject Matter***

2. The following is a statement of reasons for the indication of allowable subject matter:

a. The Examiner notes that the common feature of all of the bulk-filing status applications relates to the buffer structure. Specifically, most of the applications set forth the following layers with the optional inclusion of further layers and/or devices: monocrystalline Si substrate / amorphous SiO<sub>x</sub> interface layer / monocrystalline perovskite (such as BaSrTiO<sub>3</sub> or BSTO) accommodating buffer / monocrystalline compound semiconductor. Some applications--

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such as those directed towards waveguide structures--form other monocrystalline perovskites or oxides over the accommodating BSTO layer instead of a compound semiconductor layer.

b. The Examiners assigned to the bulk-filing project have found only two references which teach forming a mono-perovskite on mono-Si by means of an amorphous SiO<sub>x</sub> interface layer: Kaushik (already made of record in the last Office Action) and Eisenbeiser et al., Field effect transistors with SrTiO<sub>3</sub> gate dielectric on Si," 6 March 2000, Applied Physics Letters, Vol. 76, No. 10, pp.1324-1326 (which appears to contain substantially similar subject matter and which is included herewith). Both of these articles include authors who are or were employed by Motorola, and more specifically include authors Dr. Ravi Droopad and Dr. Jamal Ramdani. Further, various additional news releases/publications quote either Dr. Droopad, Dr. Ramdani and/or Motorola spokespersons as asserting that (1) Dr. Droopad invented the mono-Si/amorphous SiO<sub>x</sub>/STO structure (for use as a FET gate dielectric); (2) Dr. Ramdani came up with the idea of employing this particular structure as a buffer system for growing monocrystalline compound semiconductor layers on Si substrates; and (3) that Motorola has filed more than 270 patent applications based on this technique or concept. *See, e.g.*, Weiss, "Speed demon gets hooked on silicon," Science News Online, 9/15/2001; "Motorola develops new super-fast chip," USA Today, 9/4/2001; Valigra, "Motorola Lays GaAs on Si Wafer," AsiaBiz Tech, Nov. 2001; and "Holy Grail! Motorola claims high-yield GaAs breakthrough," Micromagazine.com (no date available).

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c. The record is presently unclear as to (1) the exact participation others may have had in inventing this subject matter; and (2) whether Dr. Droopad and Dr. Ramdani were employed by Motorola at the time of the respective inventions.

d. The Examiner further notes that various ones of the present applications do not list one or both of Dr. Droopad and Dr. Ramdani as an inventor. Also, various applications--irrespective of inventorship--were filed more than one year after the publication of the Eisenbeiser and/or Kaushik references.

e. The Kaushik and Eisenbeiser references would not be available as prior art if Applicants (1) provide proper and sufficient affidavit evidence of who were the actual inventor(s) of the mono-Si/amorphous SiO<sub>x</sub>/STO structure; (2) properly petition to correct the inventorship of any applications not including this (/these) inventor(s); and/or (3) properly petition and amend the status of those applications filed more than a year after the publication of the Eisenbeiser reference so as to make those applications continuations or continuations-in-part of application #09/502,023, now US Patent # 6,492,257, which was filed on February 10, 2000 and issued on May 21, 2002, and of which Drs. Ramdani and Droopad were named inventors. (See MPEP 201.11.V for the Office requirements regarding the untimely filing of Priority Benefit Claims and whether this option is available to the applicants in the present circumstances.)

f. If Applicant takes the necessary steps to properly remove the Kaushik and Eisenbeiser references as available prior art, and is thereby successful in overcoming all 35 USC 102(a), (b), (e), (f) and 103(a) issues based upon any of these section 102 paragraphs, the claims

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would be allowable if they include sufficiently specific limitations relating to these particular layers and their interrelationships. For example, the claims would be allowable if Applicants properly include at least the following limitations:<sup>1</sup>

- a monocrystalline silicon substrate;**
- an amorphous silicon oxide layer formed directly on the silicon substrate;**
- a monocrystalline  $\text{Ba}_x\text{Sr}_{1-x}\text{TiO}_3$  layer formed directly on the amorphous silicon oxide layer, wherein ( $0 \leq x \leq 1$ ); and**
- a monocrystalline [compound semiconductor]<sup>2</sup> layer formed on the  $\text{Ba}_x\text{Sr}_{1-x}\text{TiO}_3$  layer.**

g. If such amendments are made, any restricted claims previously withdrawn from consideration for being directed towards a non-elected invention (such as in response to a product/method, subcombination-usable-together or a combination/subcombination restriction) that depend from such a claim or otherwise include all such claim language, would be subject to rejoinder in accordance with the rejoinder guidelines of MPEP, Chapter 800.

h. The Examiner further notes that a search of the prior art failed to disclose or reasonably suggest a buffering-layer system wherein the BSTO accommodating buffer is

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<sup>1</sup>Applicant is invited to contact the Examiner with any questions regarding specific proposals for substantively broader or alternative claim language.

<sup>2</sup>As noted hereinabove, some applications set forth layers other than compound semiconductors formed on the BSTO so this term would need to be amended accordingly.



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subsequently converted to an amorphous layer. As such, any claims directed towards this embodiment would be allowable if they include at least the following limitations--*irrespective of whether the Kaushik and Eisenbeiser references are available as prior art:*

**a monocrystalline silicon substrate;**

**an amorphous  $\text{Ba}_x\text{Sr}_{1-x}\text{TiO}_3$  layer formed on the silicon substrate, wherein ( $0 \leq x \leq 1$ );**

**and**

**a monocrystalline [compound semiconductor]<sup>3</sup> layer formed on the  $\text{Ba}_x\text{Sr}_{1-x}\text{TiO}_3$  layer.**

i. It is further noted that some applications currently possess product claims that recite, *inter alia*, “a monocrystalline  $\text{Ba}_x\text{Sr}_{1-x}\text{TiO}_3$  layer,” and also include further claims depending therefrom that recite language to the effect of: wherein the monocrystalline BSTO layer is subsequently heat-treated to convert it to an amorphous layer. Such claim language is **objectionable under 35 USC 112, 4th paragraph** because such depending claims do not further limit nor add additional limitations to the previously claimed subject matter. Rather, such claim language modifies the structure of the parent claim. Accordingly, Applicant should review all of the claims and correct any such dependencies by canceling the claim or placing it independent form.

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<sup>3</sup>See the previous footnote.

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3. If (1) all of these actions cited above are properly undertaken as required, (2) terminal disclaimers are properly filed, and (3) no other significant issues remain, the Examiner will *consider* entry of amendments that place all of the claims in condition for allowance, even if submitted after prosecution is closed.

***Conclusion***

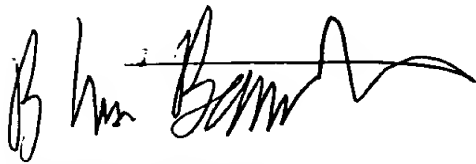
4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

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**INFORMATION ON HOW TO CONTACT THE USPTO**

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to the examiner, **B. William Baumeister**, at **(703) 306-9165**. The examiner can normally be reached Monday through Friday, 8:30 a.m. to 5:00 p.m. If the Examiner is not available, the Examiner's supervisor, Mr. Eddie Lee, can be reached at (703) 308-1690. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.

A handwritten signature in black ink, appearing to read 'B. William Baumeister', with a stylized, flowing script.

B. William Baumeister

Patent Examiner, Art Unit 2815

May 24, 2003